OUR BOOK SHELF

Elementary Mechanics. By O. J. Lodge. (London and Edinburgh: Chambers, 1885.)

THIS is a revised edition of Prof. Lodge's Text-Book:—not much altered, so far as we can see even by the help of the rapid yet searching stereoscopic squinting, from the former edition. Why a writer, who begins by acknowledging his indebtedness to the really scientific works of Thomson and Tait, Clerk-Maxwell, and Clifford, should make frequent references to the merely "popular" and singularly loose *brochures* of Deschanel and Ganot, is a question more easily asked than answered. But it is totally unintelligible to us that, having begun with classical works, he should proceed to "recommend real students to read one or other" of these poor compilations. Was it not Horace Smith who said:—

> "Is there such scanty store of standard works,
> That students must be fed on foreign trash?"

But Prof. Lodge's own standard is far above that of the books to which he, unfortunately and unaccountably, refers his "real students." His work is a curious one. There is scarcely a trace of the dogmatism which is asserted to be so natural to the *genus* Professor! The author seems to place himself on the same level with his reader, and anxiously to seek for confirmation of his own statements in the assent of his pupils. This is, to say the least, unusual; but we cannot at once either commend, or find fault with, it. It is a new departure, and its value and usefulness must be judged by its success.

There are a few elementary, but important, points in Dynamics, by his treatment of which every author on the subject shows at once whether he is "sound in the faith" or not. On the whole, Prof. Lodge passes these tests with credit; and the rest of his book is of a much higher order than the run of elementary treatises.

There are, however, here and there some singular slips, which should be corrected in future editions. We note only one or two, but even these are destructive of the character for definiteness and accuracy which should be the leading feature of every scientific book. Thus, in §5 (where, unfortunately, a "statical" definition of force is introduced as well as a "kinetic" one) we are told that *change of motion* "is called" *Acceleration;* though in later sections the true meaning:—i.e. *Rate of* Change of *Velocity:*—is assigned to Acceleration. To the mere popular reader this may appear hypercriticism; but science is most careful to distinguish not only between *Change* and *Rate of Change*, but also between *Motion* and *Velocity*. Again, in § 16, serious confusion is introduced by the statement that the velocity of a point at unit distance from an axis "*is called*" the angular velocity of the rotating body. Prof. Lodge knows perfectly well that it is not so, and that none but unscientific people could confound a quantity of dimensions $[T^{-1}]$ with another of dimensions $[LT^{-1}]$; even when, as in the present case, their *numerical* values happen to be equal. We are tempted to seek an explanation of, and thus to find an excuse for, these and other similar slips, in his inexcusable partiality for the works of Deschanel and Ganot.

P. G. T.

The Ocean, &c. By W. L. Jordan. Second Edition. (London: Longmans, 1885.)

OF this elaborate work it is enough to say that it is based on "*The* New Principles of Natural Philosophy." These principles we sketched (June 21, 1883) in an article which, as his mode of acknowledgment showed, was by no means satisfactory to our Author. That *Vis Inertiæ* was entirely misunderstood by Newton, and that *unresisted* motion ultimately comes to rest, are among the chief foundations of this work! That a terrestrial globe whose frame is carried round through a portion of a curve, and then suddenly stopped, will rotate in consequence, is conceivable: but we should try to explain the fact by bad centering, or some such cause; certainly not by the assumption that, during the curvilinear motion, one part of the equator had necessarily a greater *linear* velocity than the opposite part. Our Author does not seem to be acquainted with the most elementary properties of the kind of motion called Translation! But this is merely, on his part, the most recent revival of Jelinger Symonsism:—for it assumes the fundamental tenet of that peculiar heresy; viz. that a body, which revolves round a centre, is not rotating if it turn always the same side to the centre. It is needless to say more on this melancholy waste of time, trouble, and ready money (the latter especially); on the part of an author who has been complimented by a reviewer of one of his other works as having "a familiar acquaintance with questions of finance." See *Advertisement* appended to the present volume.

P. G. T.

Spectrum Analysis. By Dr. H. Schellen. Translated from the Third German Edition by Jane and Caroline Lassell. Edited, with Notes, by Capt. Abney, R.E., F.R.S. (London: Longmans, 1885.)

THIS is the second edition of a well known book: in its general arrangement there is little departure from the first, which appeared in 1872. While the German edition from which it has been translated was being prepared, the author unfortunately died; it is not to be wondered at therefore that the present reprint does not reflect the present state of our knowledge so accurately as did the former one; indeed there is evidence that the German editor has been compelled by the sad circumstances under which this task devolved upon him to take what was readiest to his hand.

Some of the material however is very valuable: thus, for instance, we have a complete and well illustrated account of Vogel and Huggins' work on the spectra of stars, much interesting information concerning Prof. Rowland's new concave gratings; while the English editor has added a full account of Abney, Festing, and Langley's work on infra-red spectra, and Abney and Schuster's discussion on the photographs taken during the eclipse of 1882. With these exceptions the English, French, or Italian work accomplished during the last ten years is but imperfectly referred to. The names of Thollon and Tacchini, to say nothing of Crookes and Hartley, not even being in the index. To the student therefore the book is worse than useless, it is misleading. The popular reader, however, who does not care too much for completeness will find much information conveyed in a pleasant form. The main branches of the science, both in its terrestrial and celestial applications, are dealt with, and the methods of work are given. Great interest also attaches to the various forms of instruments used in the new science; many of these are described, from a new form of pocket spectroscope—which we learn from the index was devised by Capt. Abney—to the more complex apparatus designed by Vogel, von Konkoly, and others.

The theoretical parts are perhaps most to be avoided. The chapter on the plurality of spectra, for instance, will help the reader very little in coming to a conclusion upon a subject of fundamental importance. Such a statement, too, as that on p. 268, "That Kirchhoff's theory has received full confirmation from the observations of solar total eclipses" is not so true as the writer evidently thought it to be.

Again, on the question of the change of refrangibility of light due to the motion of a light source towards or from the eye. The complete statement made by Fizeau in 1848 appears to be unknown to the author, who attributes the solution of the problem to Mach, of Prague, in the year 1860.

The translators have done their work throughout in a

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very admirable manner, showing that they possess a perfect acquaintance with the subject.

There are, however, a few minor blunders; thus, for instance, the substitution of the word "length" for "longitude" in connection with the perihelion and node, plays havoc with the elements of a comet's orbit, given on p. 584, while the diagram on p. 387, illustrating the change of wave-length, is rendered unintelligible by the misplacement of the figures indicating miles per second.

A Practical Arithmetic on an entirely New Method. By John Jackson. (London: Blackie, 1885.)

Principles of Arithmetic. By Homersham Cox, M.A. (Cambridge: Deighton, 1885.)

As the title-pages indicate, these attack the subject from quite different sides: the former is eminently practical, and everything unpractical is carefully eschewed: the latter goes into the principles and considers all from the theoretic side, giving very little practice.

Mr. Jackson aims at giving the easiest and shortest rules he can; explanations are few, the deficiency to be met by black-board illustration. The fractional form for the solution of questions is adopted in the advanced rules; but the most noticeable feature is the exclusion of the rule of "subtraction" and the substitution of what the writer calls "incremental or complementary addition." To take an example in compound complementary addition:—A pays a bill of 15*s.* 8¾*d.* with a sovereign; the tradesman says, "15*s.* 8¾*d.* with a farthing (puts it down) make 15*s.* 9*d.*, and 3*d.* (puts it down) make 16*s.*, and 4*s.* (puts it down) make one pound." There is no new difficulty introduced here, and a beginner is taught a good practical lesson. There is a vast collection of examples, numerous examination papers, and a good store of sums worked out on the usual plan, as well as on that put forward by the writer. There are 25 pages of tables containing specific gravities, a mariner's compass, a perpetual calendar (to A.D. 1925), compound interest results, square and cube numbers, prime numbers and logarithms. Some space, as might be expected, is devoted to "mental arithmetic." We have shown, we think, that this book well merits its title of a "practical" arithmetic.

Mr. Cox at once states "the object is to give an account of the principles of arithmetic, omitting all merely mercantile applications." The author takes as his guide, in the main, Cantor's "Geschichte der Mathematik," consulting also Hankel and Nesselmann ("Algebra der Griechen"); but "the conception of the subject as a whole, and many of the details, have been taken from the mathematical portions of the works of Auguste Comte, and in especial from his last great work, the 'Synthèse subjective.'"

There is no index nor table of contents, which is a drawback to the ready use of the book. There is an introduction, and then come seven chapters. Chapter I. discusses Numeration; Chapter II. is devoted to the first four rules in four sections; Chapter III., on Properties of Numbers, is divided into four sections: (1) Theorems (the commutative, the associative, and distributive); (2) G.C.M.; (3) Prime and Composite Numbers; (4) L.C.M. Chapter IV., in four sections, treats of the four rules for fractions, and in the fifth section discusses Ratio and Proportion. Chapter V., in six sections, treats of Decimal fractions. Chapter VI., in four sections, discusses powers and roots, with geometrical illustrations and resumes (in Section IV.) the subject of Ratio and Proportion (applied to incommensurable quantities). Chapter VII., in three sections, resumes the discussion of Properties of Numbers, as regards Permutations, the Arithmetical and Geometrical Progressions, and Figurate Numbers. There are a few exercises appended to the sections. The book in parts reminds us much of De Morgan's Arithmetic: it will be valuable for teachers, even if they have read the works cited in Mr. Cox's preface. It is by no means a school-book, though senior boys may derive much interest as well as profit from its perusal.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

The Recent Total Eclipse of the Sun

By last mail I sent you a brief account of my eclipse observations at Tahoraite on the 9th inst., and a diagram illustrating the corona. Owing to a miscalculation as to closing time of mail the account had to be very hurriedly written; there was no time to revise it or to find out the longitude and latitude of the point of observation, but this information I am now able to supply from the Trigonometrical Survey Records at Napier:—

	Longitude	Latitude
Centre of railway station at Tahoraite, Hawkes-bay	176° 5′ 7″·07 ...	40° 13′ 17″·22

The longitude and latitude of the nearest Trigonometrical Station, No. 83, from which the above were calculated, seems to have been originally fixed with reference to Trigonometrical Station No. 60, Lighthouse Reserve, Napier, whose latitude then, according to observations taken in January 1871, was 39° 28′ 47″·30. According to fresh observations taken in February 1885 the latitude of the same point is 39° 28′ 43″·52 ± 0° 0′ 0″·04. If both series of observations are correct, a *reduction* in latitude to the extent of about 3″·78 must have taken place since 1871.

Considering the position of New Zealand at the Antipodes of Europe, where a reduction of latitude seems to have occurred, a reduction like the one above indicated, bearing as it does on a very interesting question, has particular importance and urgently calls for confirmation. As mentioned in my last letter, the corona reminded me of an auroral display. The rays all seemed radially disposed and perfectly straight with well defined edges. The differences in length were very remarkable. All the observers I have spoken to agree as to the position of the longest ray, but not as to that of the others. The public attention was, however, fixed on the red protuberances and the other phenomena of the eclipse, and little notice was evidently taken of the corona.

N. A. Graydon

Hastings, Hawkesbay, New Zealand, September 25

Ophthalmologic Education in the United Kingdom

I did not see your notice of my translation of Fuchs's "Causes and Prevention of Blindness" until to-day. I find two accusations brought against me, which I do not admit to be well founded.

(1) I am accused of "mistranslation" because I have often rendered "Augenheilkunde" by the word "ophthalmology." You state that "the treatment of diseases of the eyes' would be the correct translation. "Ophthalmic medicine," which is my alternative translation, is more correct than the translation you offer; but ophthalmology is quite sufficiently correct, and in many cases is employed by the author indifferently with "Augenheilkunde," to express the same thing. No doubt "ophthalmology," etymologically considered, is a more comprehensive word than "Augenheilkunde" or its English synonym "ophthalmic medicine;" but custom has sanctioned its employment in the limited sense of the latter word in Germany, in France, and in this country. Thus the Professor of Ophthalmic Medicine in Vienna was Professor of Ophthalmology. Fuchs constantly speaks of "ophthalmological clinics," and in many of the medical schools of this country the lecturers on what is in other schools called "ophthalmic surgery," "diseases of the eye," &c., are called lecturers on "ophthalmology" (King's College, Yorkshire College, Liverpool University College, Owens College, Catholic University School of Medicine, Dublin).

(2) I am blamed for not correcting Fuchs when he says, "As a rule no regular lectures on ophthalmology (Augenheilkunde)

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